





| charge in cfs | | | Cadmium Concentration Coefficients | | | |
|---------------|-----------|-------------|------------------------------------|----------------|-----------|---------|
| | Intercept | coefficient | | B | Intercept | |
| Runoff | | | Low Flow November-March | | | |
| M34 | -2.771 | 0.394 | -2.28954 | <u>0.38718</u> | A72 | 0.000 |
| CC48 | 1.752 | 0.130 | 6.77165 | <u>0.10539</u> | M34 | 0.004 |
| A68 | -11.131 | 0.498 | -3.62869 | <u>0.45153</u> | CC48 | 0 |
| | | | | | A68 | 1.82408 |

Discharge Relationships among the three gages

| MONTH | J | F | M | A | M | J | J |
|--------------|----|----|----|-----|-----|------|-----|
| Intercept | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| A 72 | 64 | 63 | 77 | 155 | 682 | 1196 | 624 |
| M34 | 22 | 22 | 28 | 58 | 266 | 468 | 243 |
| CC48 | 14 | 13 | 15 | 22 | 91 | 158 | 83 |
| A68 | 25 | 25 | 31 | 66 | 329 | 585 | 300 |
| Ground water | 3 | 3 | 3 | 9 | -3 | -14 | -2 |

1/(1+BQ) Discharge Representation

| | | | | | | | |
|------|--------|--------|--------|--------|--------|--------|--------|
| A 72 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| M34 | 0.9175 | 0.9188 | 0.9008 | 0.8110 | 0.4847 | 0.3481 | 0.5072 |
| CC48 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| A68 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |

Date variables

| | | | | | | | |
|---------|--------|--------|---------|---------|---------|---------|---------|
| sin | 0.1552 | 0.6358 | 0.9276 | 0.9887 | 0.7862 | 0.3629 | -0.1441 |
| cos | 0.9879 | 0.7719 | 0.3737 | -0.1496 | -0.6180 | -0.9318 | -0.9896 |
| sin1 | 0.3066 | 0.9815 | 0.6932 | -0.2959 | -0.9717 | -0.6763 | 0.2852 |
| cos1 | 0.9518 | 0.1916 | -0.7207 | -0.9552 | -0.2361 | 0.7366 | 0.9585 |
| Consent | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

| | | | | | | | |
|-----|-----------|--------|--------|---------|---------|---------|---------|
| A72 | Intercept | 1 | 1 | 1 | 1 | 1 | 1 |
| | BQ | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| | sin | 0.1552 | 0.6358 | 0.9276 | 0.9887 | 0.7862 | 0.3629 |
| | cos | 0.9879 | 0.7719 | 0.3737 | -0.1496 | -0.6180 | -0.9318 |
| | sin1 | 0.3066 | 0.9815 | 0.6932 | -0.2959 | -0.9717 | -0.6763 |
| | cos1 | 0.9518 | 0.1916 | -0.7207 | -0.9552 | -0.2361 | 0.7366 |
| | Consent | | | | | | |

A72 Concentration **0.9** **1.3** **2.0** **2.4** **2.2** **1.6** **1.1**

| | | | | | | | |
|-----|-----------|--------|--------|---------|---------|---------|---------|
| M34 | Intercept | 1 | 1 | 1 | 1 | 1 | 1 |
| | BQ | 0.9175 | 0.9188 | 0.9008 | 0.8110 | 0.4847 | 0.3481 |
| | sin | 0.1552 | 0.6358 | 0.9276 | 0.9887 | 0.7862 | 0.3629 |
| | cos | 0.9879 | 0.7719 | 0.3737 | -0.1496 | -0.6180 | -0.9318 |
| | sin1 | 0.3066 | 0.9815 | 0.6932 | -0.2959 | -0.9717 | -0.6763 |
| | cos1 | 0.9518 | 0.1916 | -0.7207 | -0.9552 | -0.2361 | 0.7366 |
| | Consent | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |

M34 Concentration **1** **1** **1** **1** **1** **1** **0**

| | | | | | | | | |
|-------|-----------|--------|--------|---------|---------|---------|---------|---------|
| CC 48 | Intercept | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | BQ | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| | sin | 0.1552 | 0.6358 | 0.9276 | 0.9887 | 0.7862 | 0.3629 | -0.1441 |
| | cos | 0.9879 | 0.7719 | 0.3737 | -0.1496 | -0.6180 | -0.9318 | -0.9896 |
| | sin1 | 0.3066 | 0.9815 | 0.6932 | -0.2959 | -0.9717 | -0.6763 | 0.2852 |
| | cos1 | 0.9518 | 0.1916 | -0.7207 | -0.9552 | -0.2361 | 0.7366 | 0.9585 |
| | Consent | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |

CC 48 Concentratrion **2** **1** **2** **3** **3** **3** **3**

| | | | | | | | | |
|-----|-----------|--------|--------|---------|---------|---------|---------|---------|
| A68 | Intercept | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | BQ | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| | sin | 0.1552 | 0.6358 | 0.9276 | 0.9887 | 0.7862 | 0.3629 | -0.1441 |
| | cos | 0.9879 | 0.7719 | 0.3737 | -0.1496 | -0.6180 | -0.9318 | -0.9896 |
| | sin1 | 0.3066 | 0.9815 | 0.6932 | -0.2959 | -0.9717 | -0.6763 | 0.2852 |
| | cos1 | 0.9518 | 0.1916 | -0.7207 | -0.9552 | -0.2361 | 0.7366 | 0.9585 |
| | Consent | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |

A68 Concentration **2** **2** **3** **3** **2** **2** **1**

Concentratrion **1** **1** **2** **2** **2** **1** **1**

Load in pounds per day

| | | | | | | | |
|--------------|------|------|-------|-------|-------|-------|-------|
| Sum | 0 | 0 | 1 | 2 | 7 | 9 | 3 |
| A72 | 0 | 0 | 1 | 2 | 8 | 10 | 4 |
| % Difference | 0.49 | 0.09 | -0.06 | -0.09 | -0.12 | -0.14 | -0.14 |
| RPD | 0.40 | 0.08 | -0.06 | -0.10 | -0.13 | -0.15 | -0.15 |

dmium Concentration Coefficients

| BQ | sin | cos | sin1 | cos1 | Consent |
|---------|----------|----------|----------|-----------------|---------|
| 0 | 0.32001 | -0.19032 | -0.15579 | <u>-0.48788</u> | 0.000 |
| 1.06168 | 0.13396 | -0.04585 | -0.19308 | <u>-0.24108</u> | 0 |
| 0 | -0.33663 | -0.62245 | -0.47908 | <u>-0.16659</u> | 0 |
| 0 | 0.40996 | 0.28584 | -0.21475 | <u>-0.47368</u> | 0 |

| A | S | O | N | D |
|-----|-----|-----|----|----|
| 1 | 1 | 1 | 1 | 1 |
| 268 | 187 | 142 | 92 | 70 |
| 103 | 71 | 53 | 33 | 25 |
| 37 | 26 | 20 | 16 | 14 |
| 122 | 82 | 60 | 38 | 28 |
| 6 | 8 | 9 | 4 | 3 |

| | | | | |
|--------|--------|--------|--------|--------|
| 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 0.7087 | 0.7792 | 0.8247 | 0.8824 | 0.9097 |
| 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |

| | | | | |
|---------|---------|---------|---------|---------|
| -0.6271 | -0.9360 | -0.9878 | -0.7716 | -0.3573 |
| -0.7789 | -0.3521 | 0.1556 | 0.6361 | 0.9340 |
| 0.9769 | 0.6591 | -0.3074 | -0.9816 | -0.6674 |
| 0.2135 | -0.7521 | -0.9516 | -0.1908 | 0.7447 |

| | | | | |
|---|---|---|---|---|
| 1 | 1 | 1 | 1 | 1 |
|---|---|---|---|---|

| | | | | |
|---------|---------|---------|---------|---------|
| 1 | 1 | 1 | 1 | 1 |
| 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| -0.6271 | -0.9360 | -0.9878 | -0.7716 | -0.3573 |
| -0.7789 | -0.3521 | 0.1556 | 0.6361 | 0.9340 |
| 0.9769 | 0.6591 | -0.3074 | -0.9816 | -0.6674 |
| 0.2135 | -0.7521 | -0.9516 | -0.1908 | 0.7447 |

| 1.2 | 1.5 | 1.7 | 1.4 | 1.0 |
|------------|------------|------------|------------|------------|
| 1 | 1 | 1 | 1 | 1 |
| 0.7087 | 0.7792 | 0.8247 | 0.8824 | 0.9097 |
| -0.6271 | -0.9360 | -0.9878 | -0.7716 | -0.3573 |
| -0.7789 | -0.3521 | 0.1556 | 0.6361 | 0.9340 |
| 0.9769 | 0.6591 | -0.3074 | -0.9816 | -0.6674 |
| 0.2135 | -0.7521 | -0.9516 | -0.1908 | 0.7447 |
| 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |

| 1 | 1 | 1 | 1 | 1 |
|----------|----------|----------|----------|----------|
|----------|----------|----------|----------|----------|

| | | | | |
|---------|---------|---------|---------|---------|
| 1 | 1 | 1 | 1 | 1 |
| 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| -0.6271 | -0.9360 | -0.9878 | -0.7716 | -0.3573 |
| -0.7789 | -0.3521 | 0.1556 | 0.6361 | 0.9340 |
| 0.9769 | 0.6591 | -0.3074 | -0.9816 | -0.6674 |
| 0.2135 | -0.7521 | -0.9516 | -0.1908 | 0.7447 |
| 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |

3 **3** **3** **3** **2**

| | | | | |
|---------|---------|---------|---------|---------|
| 1 | 1 | 1 | 1 | 1 |
| 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| -0.6271 | -0.9360 | -0.9878 | -0.7716 | -0.3573 |
| -0.7789 | -0.3521 | 0.1556 | 0.6361 | 0.9340 |
| 0.9769 | 0.6591 | -0.3074 | -0.9816 | -0.6674 |
| 0.2135 | -0.7521 | -0.9516 | -0.1908 | 0.7447 |
| 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |

1 **2** **2** **2** **2**

1 1 2 2 1

| | | | | |
|---|---|---|---|---|
| 2 | 1 | 1 | 1 | 1 |
| 2 | 2 | 1 | 1 | 0 |

| | | | | |
|-------|-------|------|------|------|
| -0.11 | -0.06 | 0.06 | 0.30 | 0.59 |
| -0.12 | -0.06 | 0.06 | 0.26 | 0.45 |

A72

Chronic TVS at A72
a2 b2

| | | |
|----|---------|--------|
| Cd | -3.49 | 0.7852 |
| Cu | -1.7428 | 0.8545 |
| Mn | 5.8743 | 0.3331 |
| Zn | 0.8669 | 0.8473 |

Prediction Equation Coefficients
Hardness Aluminum Cadmium

| | | | |
|-----------|---------|----------|--------|
| B | 0.006 | 1.000 | 0.006 |
| Intercept | 82.304 | -26.540 | 1.020 |
| BQ | 200.676 | 5610.562 | 1.466 |
| sin | 16.936 | 158.116 | 0.599 |
| cos | 48.860 | 40.749 | 0.066 |
| sin1 | 15.385 | 127.998 | -0.265 |
| cos1 | -5.633 | 6.691 | -0.292 |
| Consent | | | |

| Month | J | F | M | A | M | J | J |
|----------|------|------|------|------|------|------|------|
| Q | 64 | 63 | 77 | 155 | 682 | 1196 | 624 |
| Hardness | 277 | 290 | 268 | 196 | 91 | 53 | 72 |
| Al ch | 87 | 87 | 87 | 87 | 87 | 87 | 87 |
| Cd ch | 2.2 | 2.3 | 2.1 | 1.7 | 1.0 | 0.6 | 0.8 |
| Cu ch | 11 | 11 | 10 | 8 | 4 | 3 | 3 |
| Mn ch | 2317 | 2352 | 2290 | 2064 | 1598 | 1333 | 1482 |
| Zn ch | 279 | 290 | 271 | 208 | 109 | 68 | 90 |

M 34

Prediction equation coefficients

Hardness Aluminum Cadmium Copper Iron Zinc

| | | | | | | |
|-----------|-----------|------------|----------|-----------|-----------|-----------|
| B | 0.013 | 1.00 | 0.021 | 0.123 | 0.06521 | 0.021 |
| Intercept | 60.05228 | 15.10361 | 0.91724 | 14.65129 | 77.70523 | 05.25873 |
| BQ | 205.02801 | 38.29032 | 0.60966 | 00.98354 | 70.29706 | 78.11589 |
| sin | 9.24827 | 69.03843 | 0.26911 | 14.16661 | -89.38888 | 88.77920 |
| cos | 32.30173 | 79.08681 | 0.20991 | 10.17487 | 38.04002 | 85.94018 |
| sin1 | | 435.43127 | -0.12214 | 1.04278 | 86.24646 | -17.99615 |
| cos1 | | 123.10453 | -0.14689 | -3.82920 | -12.30367 | -45.60154 |
| consent | | -265.10754 | | -10.75402 | 35.80515 | -98.00378 |

| MONTH | J | F | M | A | M | J | J |
|--------------|--------|-----|-----|-----|-----|-----|-----|
| Avg monthly | Q | 22 | 22 | 28 | 58 | 266 | 468 |
| Hardness | 255 | 241 | 226 | 170 | 86 | 60 | 76 |
| Chronic Stan | Al, ch | 87 | 87 | 87 | 87 | 87 | 87 |
| | Cd, ch | 2.1 | 2.0 | 1.9 | 1.5 | 0.9 | 0.7 |
| | Cu ch | 20 | 19 | 18 | 14 | 8 | 6 |

| | | | | | | | |
|-------|------|------|------|------|------|------|------|
| Mn | 2253 | 2212 | 2163 | 1969 | 1571 | 1389 | 1504 |
| Zn ch | 260 | 248 | 235 | 185 | 104 | 76 | 93 |

A68 Animas at Silverton

Prediction equation coefficients

Hardness Cadmium Copper Manganese Zinc

| | | | | | |
|-----------|---------|--------|--------|----------|----------|
| B | 0.011 | na | na | 0.010 | 0.016 |
| Intercept | 37.945 | 2.395 | 5.783 | 258.473 | 304.617 |
| BQ | 165.600 | | | 1371.923 | 644.136 |
| sin | | 1.712 | 2.049 | 611.024 | 315.451 |
| cos | | 0.140 | 0.729 | 81.662 | -18.603 |
| sin1 | | -0.250 | -1.520 | 16.031 | -33.783 |
| cos1 | | -1.185 | -0.472 | -263.628 | -140.108 |
| May | | -1.936 | 2.261 | -258.699 | |
| consent | | -0.714 | -1.828 | 411.428 | -67.174 |

| Animas R | Month | J | F | M | A | M | J | J |
|----------|----------|------|------|------|------|------|------|------|
| | | Q | 25 | 25 | 31 | 66 | 329 | 585 |
| | Hardness | 168 | 168 | 161 | 134 | 74 | 60 | 76 |
| | Cd,tvs | 1.5 | 1.5 | 1.5 | 1.3 | 0.8 | 0.7 | 0.8 |
| | Cu tvs | 14 | 14 | 13 | 11 | 7 | 6 | 7 |
| | Mn tvs | 1959 | 1961 | 1934 | 1818 | 1491 | 1393 | 1509 |
| | Zn tvs | 182 | 183 | 177 | 151 | 91 | 77 | 94 |

ction Equation Coefficients

| Copper | Iron | Zinc |
|---------|----------|---------|
| 0.100 | 0.048 | 0.014 |
| 11.592 | 325.430 | 272.266 |
| -11.516 | 6156.248 | 697.432 |
| 5.618 | 310.323 | 155.229 |
| 5.955 | 262.025 | 37.490 |
| 1.700 | -72.066 | -37.359 |
| -0.594 | -177.065 | -77.421 |
| -1.491 | | |

| A | S | O | N | D |
|------|------|------|------|------|
| 268 | 187 | 142 | 92 | 70 |
| 124 | 158 | 182 | 215 | 248 |
| 87 | 87 | 87 | 87 | 87 |
| 1.2 | 1.4 | 1.6 | 1.8 | 2.0 |
| 5 | 7 | 7 | 9 | 10 |
| 1772 | 1920 | 2013 | 2129 | 2233 |
| 141 | 173 | 195 | 225 | 255 |

Acute TVS at M34 Chronic TVS at M34

| | a2 | b2 | a3 | b3 |
|----|---------|--------|---------|--------|
| Cd | -3.828 | 1.128 | -3.49 | 0.7852 |
| Cu | -0.7703 | 0.9422 | -1.7428 | 0.8545 |
| Mn | 4.4995 | 0.7893 | 5.8743 | 0.3331 |
| Zn | 0.8904 | 0.8473 | 0.8669 | 0.8473 |

| A | S | O | N | D |
|-----|-----|-----|-----|-----|
| 103 | 71 | 53 | 33 | 25 |
| 126 | 151 | 192 | 217 | 253 |
| 87 | 87 | 87 | 87 | 87 |
| 1.2 | 1.4 | 1.7 | 1.8 | 2.0 |
| 11 | 13 | 16 | 17 | 20 |

| | | | | |
|------|------|------|------|------|
| 1783 | 1892 | 2050 | 2136 | 2246 |
| 144 | 167 | 205 | 227 | 258 |

Chronic TVS at A68

a2 b2

| | | |
|----|---------|--------|
| Cd | -3.49 | 0.7852 |
| Cu | -1.7428 | 0.8545 |
| Mn | 5.8743 | 0.3331 |
| Zn | 0.8669 | 0.8473 |

| A | S | O | N | D |
|------|------|------|------|------|
| 122 | 82 | 60 | 38 | 28 |
| 109 | 125 | 138 | 155 | 165 |
| 1.1 | 1.2 | 1.3 | 1.4 | 1.5 |
| 10 | 11 | 12 | 13 | 14 |
| 1695 | 1777 | 1836 | 1908 | 1947 |
| 126 | 142 | 155 | 171 | 180 |